



## **DEPARTMENT OF TRANSPORTATION**

### **Federal Aviation Administration**

#### **14 CFR Part 39**

**[Docket No. FAA-2022-1405; Project Identifier AD-2022-01070-E; Amendment 39-22374; AD 2023-05-05]**

**RIN 2120-AA64**

#### **Airworthiness Directives; CFM International, S.A. Turbofan Engines**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final rule.

**SUMMARY:** The FAA is superseding Airworthiness Directive (AD) 2021-10-09 for certain CFM International, S.A. (CFM) CFM56-5B and CFM56-7B model turbofan engines with a certain high-pressure turbine (HPT) inner stationary seal installed.

AD 2021-10-09 required removal, inspection, and replacement of the affected HPT inner stationary seal and, depending on the findings, replacement of the rotating air HPT front seal, HPT rotor blades, and No. 3 ball bearing. This AD was prompted by cracks found in the rotating air HPT front seal. After the FAA issued AD 2021-10-09, the manufacturer notified the FAA that the service information incorrectly lists the year of certain honeycomb repairs and that affected HPT inner stationary seals could potentially be installed on CFM CFM56-5C model turbofan engines. This AD requires removal, inspection, and replacement of the affected HPT inner stationary seal and, depending on the findings, replacement of the rotating air HPT front seal, HPT rotor blades, and No. 3 ball bearing. This AD also revises the applicability to add CFM CFM56-5C model turbofan engines. The FAA is issuing this AD to address the unsafe condition on these products.

**DATES:** This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

The Director of the Federal Register approved the incorporation by reference of certain publications listed in this AD as of [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:**

*AD Docket:* You may examine the AD docket at [regulations.gov](https://www.regulations.gov) by searching for and locating Docket No. FAA-2022-1405; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this final rule, any comments received, and other information. The address for Docket Operations is U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.

*Material Incorporated by Reference:*

- For CFM service information identified in this final rule, contact CFM International Inc., Aviation Operations Center, 1 Neumann Way, M/D Room 285, Cincinnati, OH 45125; phone: (877) 432-3272; email: [aviation.fleetsupport@ge.com](mailto:aviation.fleetsupport@ge.com).
- You may view this service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (817) 222-5110. It is also available at [regulations.gov](https://www.regulations.gov) by searching for and locating Docket No. FAA-2022-1405.

**FOR FURTHER INFORMATION CONTACT:** Kevin Clark, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7088; email: [kevin.m.clark@faa.gov](mailto:kevin.m.clark@faa.gov).

**SUPPLEMENTARY INFORMATION:**

**Background**

The FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 to supersede AD 2021-10-09, Amendment 39-21542 (86 FR 27264, May 20, 2021) (AD 2021-10-09). AD 2021-10-09 applied to certain CFM CFM56-5B and CFM56-7B model turbofan engines with an HPT inner stationary seal, part number 1808M56G01, installed. The NPRM published in the *Federal Register* on December 1, 2022 (87 FR 73683). The NPRM was prompted by cracks found in the

rotating air HPT front seal. After the FAA issued AD 2021-10-09, the manufacturer notified the FAA that the service information referenced in AD 2021-10-09 incorrectly listed the year of certain honeycomb repairs. Additionally, the manufacturer notified the FAA that affected HPT inner stationary seals could potentially be installed on CFM CFM56-5C model turbofan engines. In the NPRM, the FAA proposed to require removal, inspection, and replacement of the affected HPT inner stationary seal and, depending on the findings, replacement of the rotating air HPT front seal, HPT rotor blades, and No. 3 ball bearing. In the NPRM, the FAA also proposed to revise the applicability to add CFM CFM56-5C model turbofan engines.

### **Discussion of Final Airworthiness Directive**

#### **Comments**

The FAA received comments from three commenters. The commenters were Air Line Pilots Association, International (ALPA), American Airlines (AA), and The Boeing Company (Boeing). The following presents the comments received on the NPRM and the FAA's response to each comment.

#### **Support for the AD**

ALPA and Boeing supported the NPRM without change.

#### **Request to Specify Service Bulletins and Revision Numbers**

AA requested that the FAA specify service bulletins and their respective revision numbers throughout this AD. AA stated that paragraph (c), Applicability, references the service bulletins as follows, CFM Service Bulletin (SB) CFM56-5B S/B 72-0952, Revision 02, dated August 10, 2022 (CFM SB CFM56-5B S/B 72-0952); CFM SB CFM56-5C S/B 72-0796, Revision 02, dated August 10, 2022 (CFM SB CFM56-5C S/B 72-0796); CFM SB CFM56-7B S/B 72-1054, Revision 02, dated August 10, 2022 (CFM SB CFM56-7B S/B 72-1054). AA noted that the SB format within the parentheses abridges the complete description of the service bulletins and is used in proposed paragraphs (g)(2), (h)(2)(i), and (2)(ii). AA reasoned that this SB format could be interpreted as the original (basic) service bulletin, which provides outdated accomplishment instructions and could contribute to errors during the accomplishment of this AD.

The FAA established a shorthand notation in paragraph (c), Applicability, of the NPRM for each service bulletin, which contained the full citation, including the manufacturer name, SB number, revision number, and date, followed by the shorthand notation. The FAA then used the established shorthand notation to reference the service bulletins in paragraphs (g)(2), (h)(2)(i), and (2)(ii), as applicable, of the NPRM. Avoiding the use of the shorthand notation and including the revision numbers and dates for each SB reference is unnecessary, as the referenced service information is defined in both the preamble and the AD body. The FAA did not change this AD as a result of this comment.

#### **Request to Revise Paragraph (c) of this AD**

AA requested that the FAA revise paragraph (c), Applicability, of this AD to include the following, “This AD does not apply to affected CFM56-5B and CFM56-7B model turbofan engines with the affected HPT inner stationary seal installed if the seal has been repaired as specified in CFM56 Engine Shop Manual (ESM), 72-41-03, REPAIR 003 after December 31, 2012 and prior to the effective date, June 24, 2021, of FAA AD 2021-10-09.” AA reasoned that this language was part of AD 2021-10-09, paragraph (c), Applicability. The exclusion of this text from the final rule would make the population of HPT inner stationary seals, within the previously identified time frame, applicable to the proposed AD.

In response to this comment, the FAA has revised paragraph (c), Applicability, of this AD to include: “This AD does not apply to affected CFM CFM56-5B, CFM56-5C, and CFM56-7B model turbofan engines with the affected HPT inner stationary seal installed if the seal has been repaired as specified in CFM56-5B ESM, 72-41-03, REPAIR 003; CFM56-5C ESM, 72-41-03, REPAIR 003; or CFM56-7B ESM, 72-41-03, REPAIR 003, after December 31, 2012.”

#### **Conclusion**

The FAA reviewed the relevant data, considered any comments received, and determined that air safety requires adopting the AD as proposed. Accordingly, the FAA is issuing this AD to address the unsafe condition on these products. Except for minor editorial changes, and any other changes described previously, this AD is adopted as

proposed in the NPRM. None of the changes will increase the economic burden on any operator.

#### **Related Service Information under 1 CFR part 51**

The FAA reviewed the following service information:

- CFM SB CFM56-5C S/B 72-0796, Revision 02, dated August 10, 2022.
- CFM SB CFM56-5B S/B 72-0952, Revision 02, dated August 10, 2022.
- CFM SB CFM56-7B S/B 72-1054, Revision 02, dated August 10, 2022.

This service information, differentiated by engine model, specifies procedures for inspecting the HPT inner stationary seal honeycomb. This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in the ADDRESSES section.

#### **Costs of Compliance**

The FAA estimates that this AD affects 210 engines installed on airplanes of U.S. registry. Operators have the option to replace or repair the affected HPT inner stationary seal. The parts cost includes the estimated costs for replacement with a repaired HPT inner stationary seal.

The FAA estimates the following costs to comply with this AD:

##### **Estimated costs**

<b>Action</b>	<b>Labor Cost</b>	<b>Parts Cost</b>	<b>Cost per product</b>	<b>Cost on U.S. operators</b>
Replace HPT inner stationary seal	1 work-hour x \$85 per hour = \$85	\$7,910	\$7,995	\$1,678,950
Inspect HPT inner stationary seal	1 work-hour x \$85 per hour = \$85	\$0	\$85	\$17,850

The FAA estimates the following costs to do any necessary replacements that would be required based on the results of the inspection. The agency has no way of determining the number of engines that might need these replacements:

### **On-condition costs**

<b>Action</b>	<b>Labor Cost</b>	<b>Parts Cost</b>	<b>Cost per product</b>
Replace rotating air HPT front seal	1 work-hour x \$85 per hour = \$85	\$344,600	\$344,685
Replace HPT rotor blades (pair)	1 work-hour x \$85 per hour = \$85	\$31,000	\$31,085
Replace No. 3 ball bearing	1 work-hour x \$85 per hour = \$85	\$30,000	\$30,085

### **Authority for this Rulemaking**

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, Section 106, describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the Agency's authority.

The FAA is issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701, General requirements. Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

### **Regulatory Findings**

The FAA has determined that this AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a "significant regulatory action" under Executive Order 12866,
- (2) Will not affect intrastate aviation in Alaska, and
- (3) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

## **List of Subjects in 14 CFR Part 39**

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

### **The Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

### **PART 39 - AIRWORTHINESS DIRECTIVES**

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

#### **§ 39.13 [Amended]**

2. The FAA amends § 39.13 by:

a. Removing Airworthiness Directive 2021-10-09, Amendment 39-21542

(86 FR 27264, May 20, 2021); and

b. Adding the following new airworthiness directive:

**2023-05-05 CFM International, S.A.:** Amendment 39-22374; Docket No. FAA-2022-1405; Project Identifier AD-2022-01070-E.

#### **(a) Effective Date**

This airworthiness directive (AD) is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

#### **(b) Affected ADs**

This AD replaces AD 2021-10-09, Amendment 39-21542 (86 FR 27264, May 20, 2021) (AD 2021-10-09).

#### **(c) Applicability**

This AD applies to CFM International, S.A. (CFM) model turbofan engines identified in Table 1 to paragraph (c) of this AD with an installed high-pressure turbine (HPT) inner stationary seal, part number (P/N) 1808M56G01, that has a serial number (S/N) listed in Table 1 of CFM Service Bulletin (SB) CFM56-5B S/B 72-0952, Revision 02, dated August 10, 2022 (CFM SB CFM56-5B S/B 72-0952); Table 1 of CFM SB CFM56-5C S/B 72-0796, Revision 02, dated August 10, 2022 (CFM SB CFM56-5C S/B 72-0796); or Table 1 of CFM SB CFM56-7B S/B 72-1054, Revision 02, dated August 10, 2022 (CFM SB CFM56-7B S/B 72-1054). This AD does not apply to

affected CFM CFM56-5B, CFM56-5C, and CFM56-7B model turbofan engines with the affected HPT inner stationary seal installed if the seal has been repaired as specified in CFM56-5B Engine Shop Manual (ESM), 72-41-03, REPAIR 003; CFM56-5C ESM, 72-41-03, REPAIR 003; or CFM56-7B ESM, 72-41-03, REPAIR 003, after December 31, 2012.

**Table 1 to Paragraph (c) – CFM Model Turbofan Engines**

<b>Make</b>	<b>Model</b>
CFM	CFM56-5B1, CFM56-5B1/2P, CFM56-5B1/3, CFM56-5B1/P, CFM56-5B2, CFM56-5B2/2P, CFM56-5B2/3, CFM56-5B2/P, CFM56-5B3/2P, CFM56-5B3/2P1, CFM56-5B3/3, CFM56-5B3/3B1, CFM56-5B3/P, CFM56-5B3/P1, CFM56-5B4, CFM56-5B4/2P, CFM56-5B4/2P1, CFM56-5B4/3, CFM56-5B4/3B1, CFM56-5B4/P, CFM56-5B4/P1, CFM56-5B5, CFM56-5B5/3, CFM56-5B5/P, CFM56-5B6, CFM56-5B6/2P, CFM56-5B6/3, CFM56-5B6/P, CFM56-5B7, CFM56-5B7/3, CFM56-5B7/P, CFM56-5B8/3, CFM56-5B8/P, CFM56-5B9/2P, CFM56-5B9/3, CFM56-5B9/P
CFM	CFM56-5C2, CFM56-5C2/4, CFM56-5C2/F, CFM56-5C2/F4, CFM56-5C2/G, CFM56-5C2/G4, CFM56-5C2/P, CFM56-5C3/F, CFM56-5C3/F4, CFM56-5C3/G, CFM56-5C3/G4, CFM56-5C3/P, CFM56-5C4, CFM56-5C4/1, CFM56-5C4/1P, CFM56-5C4/P
CFM	CFM56-7B20, CFM56-7B20/2, CFM56-7B20/3, CFM56-7B20E, CFM56-7B22, CFM56-7B22/2, CFM56-7B22/3, CFM56-7B22/3B1, CFM56-7B22/B1, CFM56-7B22E, CFM56-7B22E/B1, CFM56-7B24, CFM56-7B24/2, CFM56-7B24/3, CFM56-7B24/3B1, CFM56-7B24/B1, CFM56-7B24E, CFM56-7B24E/B1, CFM56-7B26, CFM56-7B26/2, CFM56-7B26/3, CFM56-7B26/3B1, CFM56-7B26/3B2, CFM56-7B26/3B2F, CFM56-7B26/3F, CFM56-7B26/B1, CFM56-7B26/B2, CFM56-7B26E, CFM56-7B26E/B1, CFM56-7B26E/B2, CFM56-7B26E/B2F, CFM56-7B26E/F, CFM56-7B27, CFM56-7B27/2, CFM56-7B27/3, CFM56-7B27/3B1, CFM56-7B27/3B1F, CFM56-7B27/3B3, CFM56-7B27/3F, CFM56-7B27/B1, CFM56-7B27/B3, CFM56-7B27A, CFM56-7B27A/3, CFM56-7B27AE, CFM56-7B27E, CFM56-7B27E/B1, CFM56-7B27E/B1F, CFM56-7B27E/B3, CFM56-7B27E/F

**(d) Subject**

Joint Aircraft System Component (JASC) Code 7230, Turbine Engine Compressor Section.



**(e) Unsafe Condition**

This AD was prompted by cracks found in the rotating air HPT front seal. The FAA is issuing this AD to prevent failure of the HPT inner stationary seal and the rotating air HPT front seal. The unsafe condition, if not addressed, could result in uncontained release of the rotating air HPT front seal, damage to the engine, and damage to the airplane.

**(f) Compliance**

Comply with this AD within the compliance times specified, unless already done.

**(g) Required Actions**

(1) At the next engine shop visit after the effective date of this AD, remove the affected HPT inner stationary seal and replace with an HPT inner stationary seal that is eligible for installation.

(2) After removing the affected HPT inner stationary seal required by paragraph (g)(1) of this AD, inspect the removed HPT inner stationary seal for honeycomb separation in accordance with the Accomplishment Instructions, paragraph 3.C.(1), of CFM SB CFM56-5B S/B 72-0952; CFM SB CFM56-5C S/B 72-0796; or CFM SB CFM56-7B S/B 72-1054, as applicable by engine model.

(3) If honeycomb separation is found during the inspection required by paragraph (g)(2) of this AD, before further flight:

(i) Remove the rotating air HPT front seal from service and replace with a rotating air HPT front seal that is eligible for installation.

(ii) Remove the HPT rotor blades and replace with HPT rotor blades eligible for installation.

(iii) Remove the No. 3 ball bearing from service and replace with a No. 3 ball bearing eligible for installation.

**(h) Definitions**

(1) For the purpose of this AD, an “engine shop visit” is the induction of an engine into the shop for maintenance involving the separation of pairs of major mating engine case flanges, except for the following situations, which do not constitute an engine shop visit.

(i) Separation of engine flanges solely for the purpose of transportation of the engine without subsequent maintenance.

(ii) Separation of engine flanges solely for the purpose of replacing the fan or propulsor without subsequent maintenance.

(2) For the purpose of this AD, an “HPT inner stationary seal that is eligible for installation” is an HPT inner stationary seal:

(i) That is not listed in Table 1 of CFM SB CFM56-5B S/B 72-0952; Table 1 of CFM SB CFM56-5C S/B 72-0796; or Table 1 CFM SB CFM56-7B S/B 72-1054; or

(ii) With a P/N 1808M56G01 and an S/N listed in Table 1 of CFM SB CFM56-5B S/B 72-0952; Table 1 of CFM SB CFM56-5C S/B 72-0796; or Table 1 of CFM SB CFM56-7B S/B 72-1054, that has been repaired as specified in CFM56-5B ESM, 72-41-03, REPAIR 003; CFM56-5C ESM, 72-41-03, REPAIR 003; or CFM56-7B ESM, 72-41-03, REPAIR 003, as applicable by engine model, after December 31, 2012.

(3) For the purpose of this AD, a “rotating air HPT front seal that is eligible for installation” is any rotating air HPT front seal that was not removed from service as a result of the inspection of the HPT inner stationary seal required by paragraph (g)(2) of this AD in which there was a finding of honeycomb separation.

(4) For the purpose of this AD, “HPT rotor blades eligible for installation” are new HPT rotor blades with zero flight hours since new or HPT rotor blades that have been inspected and returned to a serviceable condition using FAA-approved maintenance procedures.

(5) For the purpose of this AD, a “No. 3 ball bearing eligible for installation” is any No. 3 ball bearing that was not removed from service as a result of the inspection of the HPT inner stationary seal required by paragraph (g)(2) of this AD in which there was a finding of honeycomb separation.

**(i) Credit for Previous Actions**

You may take credit for the actions specified in paragraphs (g)(1) through (3) of this AD, if you performed those actions before the effective date of this AD using CFM SB CFM56-5B S/B 72-0952, Revision 01, dated January 15, 2020, CFM SB CFM56-7B

S/B 72-1054, Revision 01, dated January 15, 2020, or CFM SB CFM56-5C S/B 72-0796 Revision 01, dated January 15, 2020.

**(j) Alternative Methods of Compliance (AMOCs)**

(1) The Manager, ECO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (k) of this AD and email to: ANE-AD-AMOC@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(3) AMOCs approved for AD 2021-10-09 (86 FR 27264, May 20, 2021) are approved as AMOCs for the corresponding provisions of this AD.

**(k) Related Information**

For more information about this AD, contact Kevin Clark, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7088; email: kevin.m.clark@faa.gov.

**(l) Material Incorporated by Reference**

(1) The Director of the Federal Register approved the incorporation by reference of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) CFM Service Bulletin CFM56-5C S/B 72-0796, Revision 02, dated August 10, 2022.

(ii) CFM Service Bulletin CFM56-5B S/B 72-0952, Revision 02, dated August 10, 2022.

(iii) CFM Service Bulletin CFM56-7B S/B 72-1054, Revision 02, dated August 10, 2022.

(3) For CFM service information identified in this AD, contact CFM International Inc., Aviation Operations Center, 1 Neumann Way, M/D Room 285, Cincinnati, OH 45125; phone: (877) 432-3272; email: [aviation.fleetsupport@ge.com](mailto:aviation.fleetsupport@ge.com).

(4) You may view this service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (817) 222-5110.

(5) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email: [fr.inspection@nara.gov](mailto:fr.inspection@nara.gov), or go to: [www.archives.gov/federal-register/cfr/ibr-locations.html](http://www.archives.gov/federal-register/cfr/ibr-locations.html).

Issued on March 5, 2023.

Christina Underwood, Acting Director,  
Compliance & Airworthiness Division,  
Aircraft Certification Service.

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